Deactivation Task Order Tour Script
April 30 and May 1, 2013

(S) – Stop and walk through
(P) – Pause and remain on Bus
(D) – Drive-by

Paducah Plant Facts

The plant is on a 3,556-acre DOE site, of which approximately 650 acres are within a fenced security area, approximately 800 acres are located outside the security fence, 133 acres are in acquired easements, and the remaining 1,986 acres are licensed to the Commonwealth of Kentucky as part of the West Kentucky Wildlife Management Area (WKWMA).

The Paducah Plant began production of enriched uranium in 1952. Construction of the plant was completed in approximately two years. The plant originally was built as part of a complex of three plants to provide enriched uranium for the U.S. Government. The other enrichment plants were located at Portsmouth, Ohio and Oak Ridge, Tennessee. Both the Portsmouth and Oak Ridge Plants no longer operate, leaving the Paducah Plant as the only gaseous diffusion plant currently producing enriched uranium in the United States.

In the 1990s, the United States Enrichment Corporation (USEC), a private company was established by the Atomic Energy Act of 1992 and uranium enrichment and support facilities were leased to USEC for operation. At the Paducah Plant, the USEC employs approximately 1000 people.

DOE and its contractors employ approximately 600 people. DOE missions at the Paducah site include

- ✓ Owner/landlord
- ✓ Environmental cleanup
- ✓ Disposal of waste
- ✓ Decontamination and Decommissioning of surplus facilities
- ✓ Storage and conversion of DUF_6

The enrichment plant buys about $500 million in power per year, almost all from the Tennessee Valley Authority (TVA). In its nearly 60 years of operation, the plant has generated more than $5 billion of revenue into the regional economy.

Because of its size and complexity, the Paducah Plant is like a small city. The plant maintains 19 miles of roadway and 9 miles of railroad track. The plant operates its own water treatment and sewage treatment plants, post office, medical facility, garage, and computer network. The plant employs almost every type of worker: engineers, operators, mechanics, painters, chemists, doctors, nurses, janitors, cooks, writers, teachers, administrative assistants, and managers. While the plant produces just one product, enriched uranium, there is an almost endless variety of work to be accomplished.

Tour Day 1 – April 30, 2013

1 C-611 Water Treatment Plant (S) – Get off bus and tour through facility

The C-611 Water Treatment System provides the water supply to the Paducah Site. The C-611 Water Treatment Plant has 15 acres of fenced area. An average 26 million gallons per day (mgd) is required at the present to support USEC operations with a peak of 30 to 32 mgd usage. The water treatment process is based on conventional water treatment techniques which include softening, coagulation, flocculation, sedimentation, and chlorination. Raw water is obtained from the Ohio River through an intake station and pumped through water-softening units at the facility.

The water is chlorinated and flocculated in the mixing basin. Approximately 99% of the suspended solids are settled out in the four reinforced, concrete-lined settling basins with a total capacity of 12 million gallons. After the sedimentation process, approximately 15% of the water is filtered, post chlorinated, and pumped to the sanitary water distribution system. The remaining water is pumped into the plant water distribution system for use as once-through cooling water or for use in the recirculating cooling water system. There are six 1-ton cylinders that have chlorine in them.

2 C-615 Sewage Treatment Plant(P) – bus stops on road in front of C-615

The C-615 Sewage Treatment Plant provides the sewage handling and treatment for the Paducah Site. The sewage collection system services all the occupied plant buildings with the exception of some remote facilities, such as the C-746-U Landfill office facility. The C-615 Sewage Treatment Plant consists of chemical, mechanical, and biological treatment prior to discharge. The C-615 Sewage Treatment Plant provides secondary treatment. It consists of a comminutor, primary and secondary settling basins, trickling filter, sludge digester and settling beds, chlorinator, and contact chamber.

Sewage is handled by four 400 gallons per minutes (gpm) basin pumps and 75 gpm sludge pumps which provide a basic plant capacity of 350 gpm. Normal flow is between 200 and 300 gpm.

3 C-764 Trailer Complex (D) – point out before we take off from C-615 stop

Trailer complexes are utilized by current DOE contractors for housing office and field personnel close to the work sites.

The C-764 Trailer Complex contains eleven trailers and houses approximately 65 people.

This complex was constructed originally to support Recovery Act work conducted at the site from 2009-2011.

4 Enter Post 15

5 C-200 Guard and Fire Headquarters (P) – pause as we come through the security fence

The plant's fire and security forces are housed in this facility. The Paducah Gaseous Diffusion Plant (PGDP) maintains a group of well-trained security and fire personnel to respond to plant emergencies. The PGDP fire department maintains equipment comparable to that found in larger cities in Kentucky. Emergency response equipment includes a 100-foot snorkel truck, two ambulances, an emergency truck, and a pump truck with foam-making capability. Some of this equipment is USEC-owned. The plant also has mutual-aid agreements with surrounding communities so we can help one another if needed during an emergency.

Security operations are comprised of Protective Force members and Security staff professionals. The Protective Force operates 7 days per week/24 hours per day, and is responsible for the implementation of the plant's security plans and policies. The Protective Force members are part of the Security, Police, and Fire Professionals of America (SPFPA) Union.

6 C-100 Administrative (P) – pause when you can see the back of the facility, including the cafeteria

The Administration Building houses the offices of the USEC General Manager and Plant Manager as well as the plant's regulator, the Nuclear Regulatory Commission (NRC) which provides regulatory oversight at the plant. The building also houses other administrative and technical support organizations such as Human Resources, Engineering, Public Affairs, Information Technology, Finance, and Nuclear Regulatory Affairs. Additionally, the Administration Building contains the plant's cafeteria with seating capacity for approximately 250 people, and also the plant's Credit Union and Medical Facility.

7 Switchyards (P) –pause on roadway and point out switchyards

Four switchyards provide electrical service to the plant. The plant typically uses between 700 megawatts and 2000 megawatts of electrical power per hour, depending on the plant's production targets and availability of reasonably priced power. The plant was built with the capacity to use up to 3000 megawatts. While the plant uses a lot of power, the enriched uranium the plant makes has the ability to generate even more power through its use in nuclear power reactors. The ratio of electrical power generated by the nuclear reactor fuel the plant enriches to the amount of power the plant uses to make the enriched uranium used as reactor fuel is approximately 30 to 1.

Electrical power comes into the plant at 161,000 volts through the overhead transmission lines from TVA's Shawnee Steam Plant and Electric Energy, Inc. (EEI) at Joppa, Illinois. Power is also provided to Kentucky Utilities through switchyards. Kentucky Utilities supplies power to a few remote facilities at the plant, such as the C-103 building. The power flows through more than 80 circuit breakers to large transformers (35) located throughout the plant. Any one of these transformers could handle the total power load of the City of

Paducah. Any one of the switchyards could handle the average power required by a large metropolitan area the size of Washington, D.C. While all the power enters the plant through the TVA and EEI power lines, the plant purchases power from various utilities throughout the Midwest. Additionally, four switchyards have interconnectivity between them that allows power to be wielded throughout.

8 C-635-6 Waste Heat Building (P) – pause bus in front of facility on the road

The gaseous diffusion process uses large amounts of power to enrich uranium. More than 90% of the power consumed is rejected as the waste heat of compression. PGDP facilities have taken advantage of the large amount of waste heat by using that heat to maintain process building temperatures. The primary source of heat that is required to keep the UF_6 in the gaseous state in site process buildings is the waste heat of compression. Supplemental steam heaters are installed in certain areas of PGDP process buildings to provide heat when portions of the process are off-line.

As improvements and additions were made to the PGDP facilities, the use of waste heat to provide non-process building heating was expanded. Systems were designed and built to pump heated recirculating cooling water (RCW) from the process buildings to the buildings requiring space heating. The pumped water is known as a recirculating heating water (RHW). Currently there are nine buildings at PGDP heated with RHW. Shutdown of the gaseous diffusion process will result in loss of waste heat source, RCW and RHW, and the internal radiant heat from the process within each building. Steps must be taken to provide alternate sources of heat or to winterize the buildings if the uranium enrichment process is shutdown.

The buildings heated with RHW are:
C-100 Administration
C-101 Cafeteria
C-102 Medical
C-200 Guard and Fire Headquarters
C-400 Cleaning Facility
C-710 Laboratory
C-720 Maintenance Shops
C-750 Garage
C-360 Toll Transfer and Sampling

9 C-600 Steam Plant (S) – stop and get off the bus and go and look inside facility

Steam is required for heating the buildings and to keep the process piping warm so the UF_6 stays in the gaseous form. The steam plant has three boilers (two coal-fired and one oil- and/or gas-fired) with a combined capacity of about 300,000 pounds of steam per hour. The boilers at the steam plant can run off of coal, oil, or natural gas. Two of the boilers are fired by coal and oil and the third by gas or oil. The use of electrostatic precipitators and low-sulpher coal helps the plant keep atmospheric emissions below environmental limits. The steam plant uses approximately 35,000 tons of coal per year.

10 Burial Grounds, SWMUs 2, 3, &4 (P) – pause and point out burial grounds

In the plant's early years of operation, material and equipment removed from the facility were buried in a series of on-site disposal areas. These burial grounds include both classified and non-classified material.

There are more than 60 acres of old waste burial grounds. They contain materials from household/commercial waste to radioactive, hazardous and flammable waste. SWMU 3, which is also called the C-404 Landfill is a closed hazardous waste landfill managed through a post-closure RCRA permit.

SWMU 4 (C-747 Contaminated Burial Yard and the C-748-B Burial Area) is currently being characterized to better delineate areas of higher contamination to determine if excavations should occur in the future as part of the CERCLA process.

SWMU 2 (C-749 Uranium Burial Grounds) contains primarily buried uranium that was immersed in oils to address flammability concerns. There has been an Interim Record of Decision in place to monitor the unit for releases. Final actions will be addressed in accordance with the Site Management Plan under the Federal Facility Agreement

Releases from these burial grounds may have affected, or have the potential to affect, groundwater underneath the areas. Remediation of these burial grounds has been broken into five subprojects, with decisions pending on the various cleanup remedies.
Excavation may be required at some of the burial grounds due to the potential for highly toxic, mobile waste.

11 C-752-A Waste Storage and Treatment (S) – stop and go in facility and then point out C-753-A

C-752-A is a permitted RCRA Waste Storage Facility. It is one of four permitted facilities. It was completed in 1996, and is a 42,000 sq. ft. facility. It stores TSCA, RCRA, and Low-Level Waste. Ignitable waste cannot be store in C-752-A; it has to be stored in C-733. Waste water is also stored in C-752-A. It also houses an enclosed activated carbon filtration unit that removes PCBs and TCE from wastewater before discharge to effluents within permitted levels. The facility contains a sprinkler system. There has been periodic maintenance performed to patch cracks in the floor to ensure compliance with permit requirements. Nearby is also the C-753-A Toxic Substances Control Act (TSCA) Waste Storage Facility.

12 C-616 Liquid Pollution Abatement Facility (P) – pause and then turnaround and head back down roadway

The PGDP RCW systems are treated for corrosion control with a phosphate-based inhibitor for steel, a copper corrosion inhibitor, and a dispersant. Because a large quantity of RCW is lost through evaporation in the cooling towers, the concentration of soluble salts and

nondissolved impurities will increase unless some means is used to control it. To control this at PGDP, a blowdown is used. The corrosion inhibitors and other contaminants in the blowdown prohibit direct discharge of this water to the receiving stream. The purpose of the C-616 Liquid Pollution Abatement Facility is to treat this waste water to lower the contaminant concentrations below the discharge limits.

Blowdown from the four cascade cooling tower systems is pumped into a collection system that routes the blowdown to C-616. The blowdown flow is measured at the-C-616 influent valve vault. The C-616 Liquid Pollution Abatement Facility uses both chemical and mechanical processes. Ferrous sulfate, calcium oxide, and a cationic polymer are used to precipitate contaminants in the blowdown water for removal. Clarifiers provide for the flash mixing of the chemicals with the incoming blowdown water and recirculating sludge, coagulation, and clarification within a single tank.

13 Nickel Ingots (D) – drive through gated roadway passing the ingots

The East End Smelter created 9,700 tons of nickel ingots volumetrically contaminated with radionuclides and a small portion also contain asbestos. Estimated value of the nickel exceeds $150 million, but can vary widely based on fluctuating market prices for scrap metals. DOE is evaluating the possibility of having industry reuse/recycle the nickel if it can be decontaminated to meet robust health and safety standards.

The ingots were made from metal reclaimed during Cascade Improvement Programs in Paducah and Portsmouth in the 1970s and 1980s. Each of the ~24-inch by 18-inch ingots weighs about a ton. The ingots are 99.9 % pure nickel. They have been sampled several times since recasting and contain levels of radionuclides that exceed International Atomic Energy Agency clearance limits.

14 Burial Grounds, SWMUs 5, 6, 7, &30 (D) – drive by and point out burial grounds

SWMUs 5 (C-746-F) and 6 (C-747-B) are located in the northwestern section of the PGDP industrial area. SWMU 5 (~4.5 acres) operated from 1965 to 1987. Disposal cells at SWMU 5 were used for the burial of components from the "Work for Others" activities, some radionuclide contaminated scrap metal, and slag from the nickel and aluminum smelters. SWMU 6 (~0.3 acres) operated from 1960 to 1976. Wastes disposed in SWMU 6 include magnesium and aluminum scrap metal and larger metal waste (exhaust fans, modine trap).

SWMUs 7 and 30 (**C-747-A Burial Grounds and Burn Area)** are located in the northwest corner of the PGDP secured area. SWMU 7 (~5.5 acres includes six discrete burial cell areas used for disposal of wastes from 1957 to 1979. Wastes disposed of in SWMU 7 include noncombustible contaminated and uncontaminated trash, scrap metal (including empty used drums), material, and equipment. Previous investigations have documented volatile organic compound (VOC) (Trichloroethene (TCE) and degradations products) concentrations attributed to an Upper Continental Recharge System (UCRS) dense nonaqueous-phase liquid (DNAPL) at SWMU 7. SWMU 30 (~2.7 acres) was used from 1957 to 1970 to burn combustible trash, which may have contained uranium contamination. Material disposed in

this area included trash, ash and debris, as well as the remnants of the incinerator used to burn the trash.

15 C-612 Groundwater Treatment Facility (P) – point out the Northwest Plume Groundwater Treatment Facility

DOE operates two groundwater treatment systems under Interim Remedial Action Records of Decisions at the site. The Northwest Plume Groundwater System (NWPGS) (C-612), an interim action, is designed to reduce off-site migration of the high concentration portions of TCE and Tc-99 in the Northwest Plume. TCE is removed by an air stripping process. The TCE is volatilized in a low-profile air stripper by introducing a large volume of air into the contaminated groundwater. Activated carbon filtration beds then are used to remove the TCE from the off-gas generated by the air stripper before the air is discharged to the atmosphere. Tc-99 is removed from the groundwater by an ion exchange process.

Beginning in August 2010, the NWPGS switched from withdrawal from the original four extraction wells to withdrawal from two new extraction wells located at the north boundary of the industrial area of PGDP (in the vicinity of the original south well field). The location of these extraction wells was optimized to capture the core and the lateral extent of the Northwest Plume in the area of the north plant boundary, consistent with the technical assessment of the NWPGS in the latest Five-Year Review.

The Northeast Plume Containment System (NEPCS) (C-617) consists of two extraction wells, an equalization tank, a transfer pump, a transfer pipeline, and instrumentation and controls. Characterization and construction activities were completed in December 1996. System startup and operational testing were conducted, and full operation began in February 1997.

System operation includes pumping groundwater contaminated with TCE from two extraction wells to the equalization tank. A transfer pump is used to pump the contaminated water from the equalization tank through a transfer pipeline (approximately 6,000 linear ft.) to the top of the C-637-2A or C-637-2B Cooling Tower. C-637-2A is the primary destination; however, if C-637-2A is off-line, flow is transferred to the C-637-2B tower. The cooling tower acts as an air stripper and removes the TCE from the groundwater as it moves through the tower.

There is a project underway to optimize the NEPCS similar to what was done with the NWPCS and also replaces the cooling tower air stripping with a skid-mounted air stripping to be prepared for eventual shut-down of the cooling towers. This project is scheduled for completion in Fiscal Year 2013.

16 C-613 Sedimentation Basin (D) – Point out as we drive past

The C-613 Sedimentation Basin was built in 2002 to support the scrap metal removal project, but also continues to capture runoff from the northwest corner of the plant site. The basin captures runoff water to contain potential contaminants mobilized by field work and has a 5-

million gallon capacity and is 17 feet deep at the lowest point. Solids with potential contaminants are settled and once discharge parameters are reached (pH and Total Suspended Solids), water is periodically discharged to KPDES Outfall 001.

17 Southwest Plume Groundwater Treatment Sites (D) – point out general areas as we drive past both SWMU 001 areas and the areas around C-720

The 2.2-acre oil landfarm, above was used from 1973-1979 to biodegrade waste oils. Starting in the fall of 2013 large diameter augers (illustration at right) will inject reactive iron in the ground and mix it with soil to a depth of about 50 feet. Results from soil testing in 2012 will help determine whether two other source areas, near the C-720 Maintenance and Storage Building, will be monitored long-term or bioremediated starting in 2014. These three source areas contribute to groundwater contamination in the Southwest Plume.

18 C-400 Groundwater Treatment System (S) – get out and go in treatment unit facility

Construction is underway for implementing Electrical Resistance Heating (ERH) treatment to address TCE contamination in the soils in the shallow area above the aquifer (0 to 60 ft.). This is known as Phase IIa, which is a continuation of the treatment used in Phase I that already addressed two smaller areas to the west and east of the C-400 facility. In 2010, the Phase I system was operated successfully, removing 580 gal (6,960 lb.) of TCE from the subsurface. A technical evaluation of Phase I, completed in 2010, documented the heating operations. The Phase I project was able to heat the UCRS as planned, but was unable to heat the lower RGA to target temperature. DOE is working with regulators on a plan for C-400 Phase IIb to treat TCE in the Regional Gravel Aquifer 60 to 100 feet deep near C-400. Implementation is planned for 2014. An estimated maximum of 4,500 gallons of TCE are in the deep aquifer (60 to 100 ft.), compared with the maximum of 2,500 gallons of TCE in the shallow area above the aquifer (0 to 60 ft.)

19 Exit Post 48 – drive out Post 48 go towards Post 57 and exit buffer area. We will go on Woodville road to Metropolis Lake to Ogden Landfill Road to go up to the C-746-U Landfill

20 C-755 Trailer Complex(D) – drive past and point out trailers and facilities

The C-755 Construction Staging Area is a 7-acre complex that provides office trailers and a change house for contractor subcontractors just outside the plant security fence. The area was completed in 1995 and provides trailers for construction management and safety staffs and a laboratory and trailers for groundwater monitoring staff. The area includes prefabricated metal buildings for equipment decontamination, showers/change rooms and provisions for trailers for subcontractors for various projects. There are approximately 21 trailers, a change house, and maintenance building supporting approximately 150 people.

21 Little Bayou Creek and General Monitoring Areas (D) – point out creeks, outfalls, SWMU/Soil Pile areas, etc.

DOE and its contractors are committed to enhancing its environmental stewardship and to reducing any impacts that its operations may cause to the environment. The Environmental Monitoring Program at PGDP consists of effluent monitoring, environmental surveillance, and air monitoring around the plant. Requirements for routine environmental monitoring programs were established to measure and monitor effluents from DOE operations and maintain surveillance on the effects of those operations on the environment and public health through measurement, monitoring, and calculation. The Environmental Monitoring Program is documented in the Environmental Monitoring Plan (EMP) available on the reference library website.

The Paducah Site is situated in the western part of the Ohio River basin. The confluence of the Ohio River with the Tennessee River is about 15 miles upstream of the site, and the confluence of the Ohio River with the Mississippi River is about 35 miles downstream. PGDP is located on a local drainage divide. Surface water from the east side of the plant flows east-northeast toward Little Bayou Creek, and surface water from the west side of the plant flows west-northwest toward Bayou Creek. Bayou Creek is a perennial stream that flows toward the Ohio River along a 9-mile course. Little Bayou Creek is an intermittent stream that flows north toward the Ohio River along a 7-mile course. The two creeks converge 3 miles north of the plant before emptying into the Ohio River.

Groundwater flow originates south of the Paducah Site within Eocene sands and the Terrace Gravel. Groundwater within the Terrace Gravel discharges to local streams and recharges the RGA. Groundwater flow through the UCRS predominantly is downward, also recharging the RGA. From the plant site, groundwater generally flows northward in the RGA toward the Ohio River, which is the local base level for the system.

The Paducah Site is affected primarily by the regulations for point source discharges regulated under the Kentucky Pollutant Discharge Elimination System (KPDES) permit. DOE currently monitors 5 outfalls as part of their permit and USEC monitors 10 outfalls. These outfalls discharge to either Little Bayou Creek or Bayou Creek. These are listed in the back of the tour book.

The Annual Site Environmental Report available in the reference library website provides a good overview of the environmental monitoring conducted at the site by DOE and the overall environmental programs and status.

22 C-746-U Solid Waste Contained Landfill (P) – stop bus in front of office facility and slowly pull past to show the landfill

The C-746-U Solid Waste Contained Landfill is the only operating disposal site at the Paducah plant. It opened in 1997 and has helped DOE reduce disposal costs by accepting certain types of waste: sanitary waste, soil and debris and industrial waste. It is permitted through the Kentucky Division of Waste Management to accept non-hazardous solid waste. No hazardous is accepted; however, waste with small amounts of radioactivity within the landfill's Authorized Limits is acceptable. No radioactive waste above Authorized Limits is accepted. Currently, they are placing waste in Cells 4 and 5, with a small amount still being

placed in Cell 3. The landfill is permitted for up to 21 cells. The landfill also contains a leachate treatment system that treats and discharges leachate collected from the C-746-U Landfill, as well as, the C-746-S&T leachate that is brought by tank to the treatment facility.

23 West Kentucky Wildlife Management Area and Bayou Creek (D) - As we drive back to Kevil, point out the wildlife management area and various locations.

As mentioned at the beginning of the tour, 1,986 acres are licensed to the Commonwealth of Kentucky as part of the West Kentucky Wildlife Management Area (WKWMA). During World War II, the Kentucky Ordnance Works was operated in an area southwest of the plant on what is now a wildlife management area. DOE interfaces on a routine basis with the Kentucky Department for Fish and Wildlife to coordinate work arrangements when maintenance activities, security changes, hunting arrangement, or other activities have the potential to affect each agencies' activities.

TVA owns a large tract of land north of the enrichment plant where they built a power plant.

Three small communities are located within 3 miles of the DOE property boundary at PGDP: Heath and Grahamville to the east and Kevil to the southwest. The closest commercial airport is Barkley Regional Airport, approximately 5 miles to the southeast. The population within a 50-mile radius of PGDP is about 534,000. Within a 10-mile radius of PGDP, the population is about 66,000.

24 Return to Kevil Facility

Deactivation Task Order Tour Script
April 30 and May 1, 2013

(S) – Stop and walk through
(P) – Pause and remain on Bus
(D) – Drive-by

Tour Day 2 – May 1, 2013

1 Enter Post 15

2 C-300 Central Control Building (S) – stop and go in to control area

The Enrichment process separates lighter uranium-235 isotopes from heavier uranium-238. Gas is forced through a series of porous membranes (barriers) with microscopic openings. Uranium-235 moves through the membranes more easily, increasing the concentration of uranium-235 as it moves through the process.

A set of enrichment equipment, known as a "stage," includes an electric motor powering a compressor that forces the gas through the barriers located in the converter.

There are 1,760 stages in the four process buildings and 60 stages in the purge and product facility and about 400 miles of process lines. Stages are arranged in groups called cells.

There are four process buildings with 74 acres under roof.

The Central Control Facility monitors, coordinates, and/or controls critical plant processes, power distribution, utilities, communications, plant alarm systems, and emergency operations. More than 10,000 miles of cable supply electronic information about the plant's process systems to this building. The Central Control Facility houses four main functions: the plant shift superintendent, the cascade coordinator, the power supervisor, and the emergency operations center.

Plant Shift Superintendent (PSS): The Plant Shift Superintendent is the senior manager on shift and represents the General Manager. The PSS has the authority and responsibility to make decisions to ensure safe operation of the plant. The PSS is responsible for overall operations of the plant and acts as incident commander in the event of a plant emergency.

Cascade Coordinator: The Cascade Coordinator monitors and controls the enrichment process to ensure it operates safely and efficiently. Cascade Coordinators monitor production in all the major process buildings through computers, panel indicators, and direct phone conversations. The Cascade Coordinators, with input from the Power Supervisor, direct operational adjustments in each building to maintain power loads at contracted levels.

Power Supervisor: The Power Supervisor continuously monitors the electrical power load for each building in the plant as well as the total plant power load. USEC has contracts with electrical utilities to provide power to the plant. It is the Power Supervisor's responsibility, along with the Cascade coordinator, to run the plant efficiently and optimize the Company's power purchases.

Emergency Operations Center (EOC): In the event of a plant emergency, the Shift Superintendent may choose to activate the EOC and bring together a team of managers and technical advisors to direct activities and develop strategies.

3 C-310 Product Withdrawal (P) – pause in front of facility

Enriched uranium is withdrawn from the cascade at the Product Withdrawal Facility. This building is equipped with withdrawal positions to accommodate either 2 ½- (30B) or 10-ton (48X) product cylinders. The large tower next to the west side of the building is a 200-foot stack used to vent gases from the enrichment process. Monitors on the stack ensure the gases emitted from the stack are not harmful and meet environmental standards. The tower also is fitted with meteorological instruments that provide weather data to the Plant Shift Superintendent.

4 C-333 Process Building (S) – stop, go in and sign in, go up to cell floor and view operating equipment

The enrichment process at PGDP occurs primarily in four large cascade process buildings that enrich uranium by the gaseous diffusion process. The PGDP enrichment process consists of approximately 1,800 stages arranged in two parallel cascades for products up to 2.75 wt. % ^{235}U. Through different valving configurations, the plant is able to enrich uranium at higher assays up to 5.5 wt. % ^{235}U.

The larger process buildings are approximately 1100 feet long by 970 feet wide, and 83 feet high. Each large process building contains approximately 26 acres under roof.

The smaller process buildings are approximately 804 feet long by 640 feet wide, and 68 feet high. Each smaller process building contains approximately 13 acres under roof.

The enrichment, or separation process, takes place on the second floor of a cascade process building inside a heated housing that helps ensure the uranium hexafluoride stays in a gaseous form. The uranium hexafluoride is pumped through many large tubes installed inside a diffuser vessel called a converter. The gas is pumped through the converters by large compressors that are powered by electric motors. Motors for the large process equipment may be rated up to 3,300 horsepower.

As the uranium hexafluoride gas passes through the tubes, the molecules separate slightly. The U-235 atoms, which make up less than one percent (.711) of the uranium in its natural state, pass through the tubes more easily. As the gas moves through the cascade, more separation occurs at each stage. At the top of the enrichment process, the uranium has been enriched so that it now contains between 1 and 5 percent of the fissionable U-235 atoms. The remaining uranium, stripped of most of its U-235 atoms, moves to the bottom of the enrichment process and is removed and stored in cylinders as depleted uranium.

The electrical equipment and instrumentation to support and control the enrichment process are located on the first floor of the building along with an Area Control Room where the buildings' processes are monitored.

5 C-315 Tails Withdrawal (P) – pause in front of facility

At the Depleted Uranium Withdrawal Facility, the uranium that is depleted of most of its U-235 atoms is pulled from the cascade process and drained into 14-ton cylinders for storage. This facility may fill between one to four cylinders per day. Once filled, the cylinders are moved with cylinder haulers to storage yards.

The cylinder haulers used at PGDP were specially designed to safely carry heavy cylinders of uranium. The cylinder haulers were built for the enrichment plants by a company that manufactures equipment for the logging industry.

6 Fire Water Tank (D) – point out towers as we drive by

The checkered tower provides water to the plant's fire protection system. This tower is 325 feet tall and holds about 325,000 gallons of water. It is one of the largest water towers in the United States. The fire water tower provides water to more than 100,000 sprinkler heads installed in the plant that cover approximately 8.5 million square feet of buildings and equipment. There are also more than 3200 portable fire extinguishers in the plant. The fire protection system covers all the process buildings and most of the support facilities.

The blue tower provides water for the plant's sanitary water supply. This tower is 185 feet tall and holds approximately 250,000 gallons of water. The water tower supplies water to the high pressure fire water system.

7 C-360 Toll Transfer and Sampling Building (S) – stop and go in facility

The Transfer and Sampling facility provides systems for receiving, sampling, transferring and shipping cylinders containing UF_6. This facility provides all operations necessary for fulfilling enrichment service contracts for private industry. Feed material, as well as the plant's enriched product, may be weighed and tested at this facility to ensure it meets industry standards. Four autoclaves, similar to the ones housed in the vaporizer facilities, are used to sample and/or transfer UF_6. A new annex facility is used to prepare customer orders for shipment.

The Toll Transfer and Sampling Building is divided into a high-bay work area of about 18,000 square feet and a low-bay service area of 3,593 square feet. The service (basement) area houses the transfer station and scales, cold traps, evacuation drums, and associated piping. The laboratory area is located north of the work area on the same level and contains four sampling stations, laboratory bench, and control panels to monitor and control building operations. The east side of the building has crane doors that allow the movement of overhead cranes in and out of the building if required. Roll-up doors are provided at truck entrances, rail entrance, and entrances to maintenance areas. Current, authorization basis does not allow filling of the 14-ton cylinders in this building, only the 10-ton cylinders.

8 Cooling Towers (P) – pause and point out cooling towers for each process building

There are four sets of cooling towers used to remove heat from the enrichment process - one set of cooling towers dedicated to each process building. Heat, generated by compression of the UF_6 gas inside the converters, is removed by refrigerant systems. The refrigerant systems are then cooled by water. As the water gets hot from passing over the refrigerant tubes, the water is moved by underground pipes to the cooling towers. The water is pumped to the top of the towers through pipes and is then cooled by exposure to air, causing the clouds of steam. About 500 million gallons of water are recirculated in the plant every 24 hours -that is roughly equivalent to filling a 14-foot deep swimming pool the size of a football field in 15 minutes. Nearly 12 million gallons of water evaporate each day and are replaced with water from the Ohio River.

9 UF_6 Feed Facilities (Vaporizers)

PGDP has two feed vaporizer facilities, each located adjacent to the large enrichment process buildings. Feed material for the enrichment cascade is manufactured from mined uranium or partially depleted or enriched UF_6. The C-337-A Vaporizer is one of two feed points for uranium hexafluoride for enrichment into the plant. The feed facilities are used to convert the uranium hexafluoride from a solid to a gaseous state and transfer the material into the cascade for enrichment. To accomplish this, cylinders are heated inside cylindrical pressure vessels called autoclaves which are approximately 22 feet long with an internal diameter of about 6 feet. The feed facilities can provide an uninterrupted feed supply to any point in the cascade. Each feed facility also is equipped with two 20-ton cranes used to move cylinders. Scales used for weighing cylinders in the feed facilities have a capacity of 40,000 pounds and are accurate to plus or minus 2 pounds. The autoclaves are steam heated.

10 Waste Disposal Alternative Site 5A (D) – point out the general area for the site that is being considered for the Onsite Disposal Facility

DOE is completing a remedial investigation/feasibility study to evaluate waste disposal alternatives for Comprehensive Environmental Response, Compensation, and Liability Act waste that will be generated from environmental restoration activities and from future D&D activities at the PGDP. These activities are expected to generate an estimated 3.6 million cubic yards of waste from 2014 to 2039. Waste types are anticipated to include the following:

- ✓ Hazardous waste
- ✓ Mixed low-level waste
- ✓ Toxic Substances Control Act waste
- ✓ Low-level waste
- ✓ Nonhazardous solid waste

High-level, transuranic, and spent nuclear fuel, if generated, will be disposed of off-site no matter which alternative is chosen, because regulations prescribe disposal in special repositories.

If the alternative to construct an on-site waste disposal facility is chosen, several locations are being considered as indicated in the tour book. This site is Site 5A.

11 C-400 Cleaning Building (S) – stop and go in front area of the building

The C-400 Chemical Operations Facility, built in 1953, provides cleaning and decontamination services for the plant. It has a floor area of 116,140 square feet. Equipment removed from the process buildings for repair is cleaned here prior to being moved to the maintenance facility. Cylinders are also cleaned and tested at this facility. The Chemical Operations Facility also houses the plant's laundry which cleans and mends more than 3,000 pairs of coverall each week.

The floor drains in the C-400 building that are near fissile operations without secondary containment have been sealed or have engineered controls in place as a control to help

prevent a criticality from occurring in the drain systems and associated sumps in the event that fissile solutions are spilled onto the floor.

12 C-710 Laboratory (S) – stop and walk through and view inside laboratory rooms and walk through annex

The C-709 Plant Laboratory Annex and the C-710 Technical Services Building house laboratories with an array of modern analyzers and test equipment, offices, a conference room, and vault for records retention and storage.

The PGDP Analytical Laboratory maintains a suite of analytical services that are tailored to meet the needs of the PGDP site including UF_6 enrichment activities, USEC and DOE permitted environmental activities, enrichment and DOE waste generation, DOE project activities, and DOE tails conversion activities. The PGDP Laboratory utilizes standard operating procedures to perform services in support of USEC and DOE activities. The PGDP Laboratory is a Department of Energy Consolidated Audit Program (DOECAP) laboratory and maintains laboratory accreditations from the State of Utah Department of Health, EPA-National Environmental Laboratory Accreditation Conference (NELAC) and the American Industrial Hygiene Association (AIHA). The PGDP Laboratory uniquely includes Non-Destructive Assay (NDA) testing in its DOECAP purview.

The laboratory facilities analyze over 100,000 various types of analytical tests per year, such as analyzing for metals, radiological, organics, inorganics, volatiles, and semivolatiles. Media types such as groundwater, concrete, soil, air, waste waters are processed through the laboratory, also supporting the environmental cleanup programs.

13 C-720 Machine Shop(S) – stop and walk through green walkway – bus will pickup passengers on the other side of building.

The C-720 facility is larger than five football fields and contains the fabrication and maintenance shops that support plant operations. Shipping and receiving is also located at this facility. Almost every industrial craft is represented here, including painters, carpenters, sheet metal workers, plumbers, electricians, instrument and maintenance mechanics, machinists, laborers and heavy equipment operators. The crafts housed in this building have the capability to fabricate, repair, maintain, and calibrate almost every piece of equipment essential to the operation of the plant.

The high bay portion of the facility contains metal fabrication and machining equipment; overhead crane bays; electrical motor facilities which include support equipment necessary to completely rebuild and test electrical motors and electrical protective equipment and electrical insulating gloves; climate controlled shop areas for precision work; electronic repair facilities; and paint spraying facilities.

There are 72 milling machines, both horizontal and vertical ranging in size from a Bridgeport with a 9 inch by 36 inch table to a Gray 20 foot table with a 72 inch vertical head travel. They are also equipped with nine tape controlled and computerized numerical controlled

milling machines, dive tape controlled drilling machines, 14 radial drills ranging from the small table and floor models up to the Cincinnati Bickford which has a 24-inch diameter column and a 10-foot arm.

Various equipment is available for all types of grinding, shaping, forming and welding.

14 Exit Post 15 – drive out gate

15 Waste Disposal Alternative Site 3A (D) – slow past the DUF6 facility before going out Post 57

The area to the south of the DUF6 conversion facility is Waste Disposal Alternative Site 3A being considered for a proposed Onsite Disposal Facility.

16 Return to Kevil Facility